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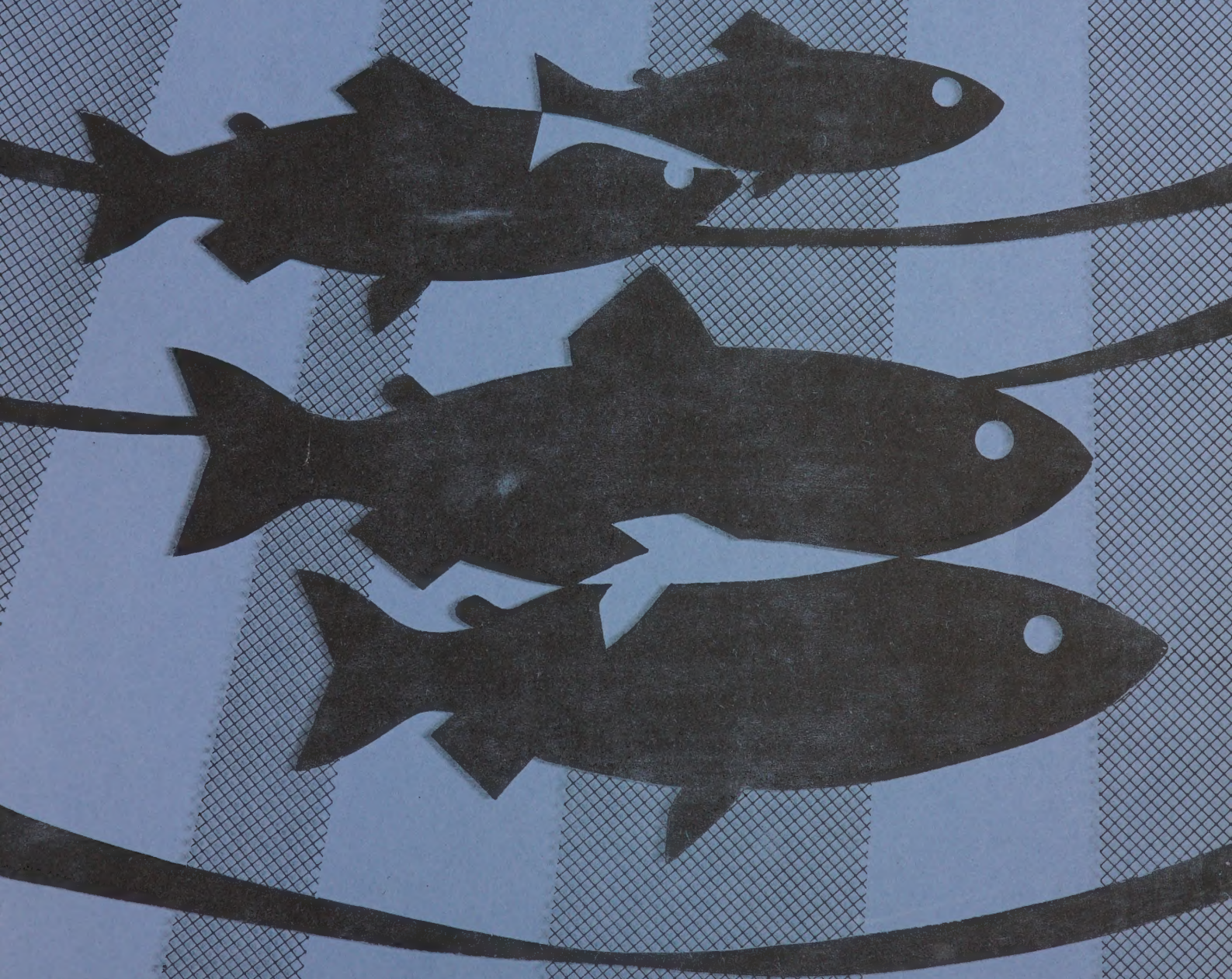
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Preliminary Biological Survey of Utikuma
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Preliminary Biological Survey of Utikuma and Utikumasis Lakes

by A.R. SMITH



SURVEY REPORT No. 7

Alberta Fish and Wildlife Division
FISHERIES SECTION

PRELIMINARY BIOLOGICAL SURVEY
of
UTIKUMA and UTIKUMASIS LAKES

by
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Fishery Biologist

August 1969

Fish and Wildlife Division
Department of Lands and Forests

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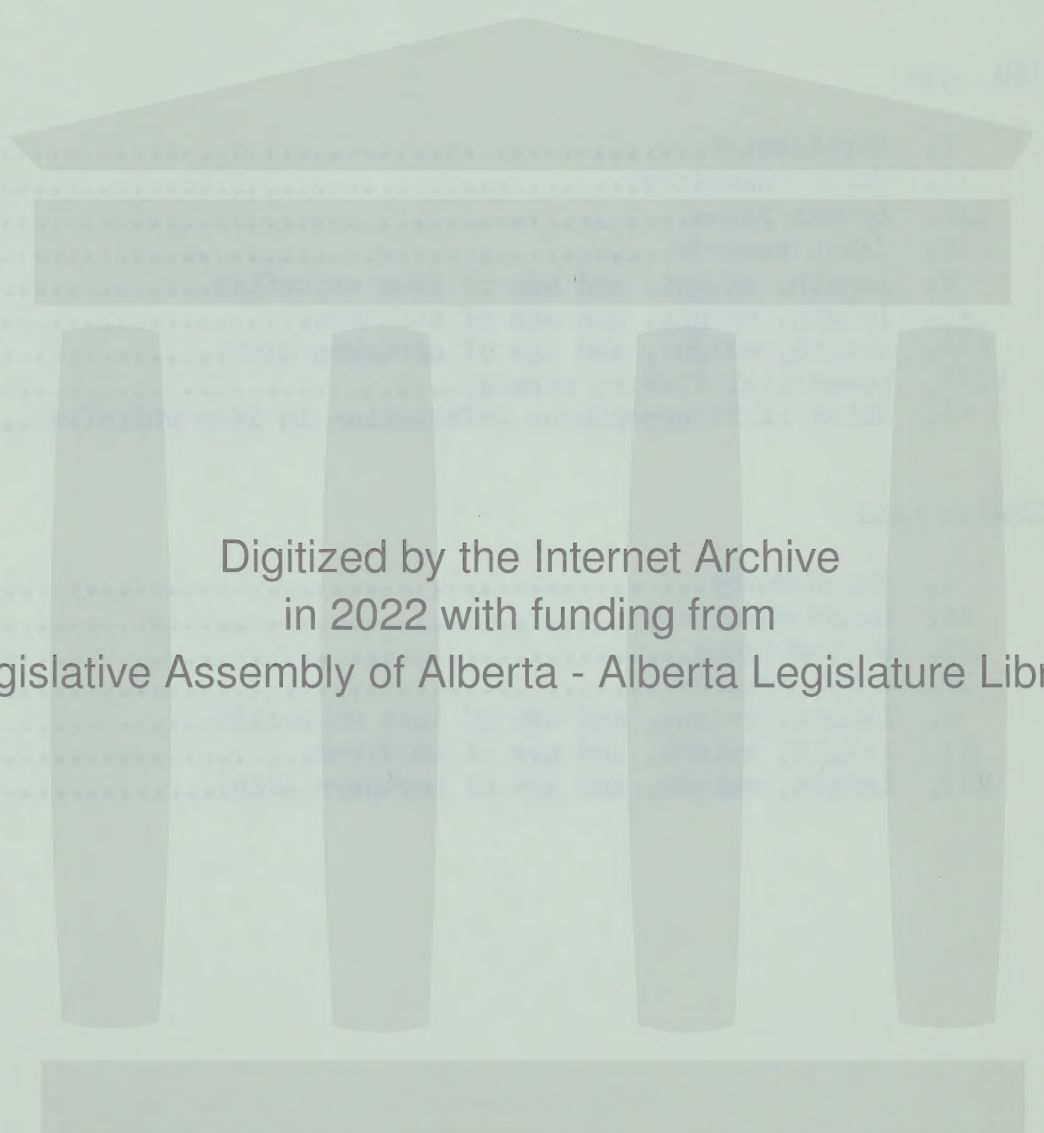
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PRELIMINARY BIOLOGICAL SURVEY of
UTIKUMA AND UTIKUMASIS LAKES

Utikuma and Utikumasis Lakes were surveyed during the period of August 15 to 25, 1968, to assess their fisheries potential. Both lakes are located about 18 miles north of Lesser Slave Lake and form part of an extensive system drained by the Utikuma River. The Utikuma drainage basin is about 1,300 square miles in area. The Utikuma River eventually combines with the Shoal River to form the Muskwa River, which in turn is a tributary of the Wabasca River.

The topography of the area is of very low relief and the boundaries of the Utikuma watershed are correspondingly ill-defined. To the south, the area is bordered by a low range of hills running along the north shore of Lesser Slave Lake. On the west side is the South Hart River drainage system, while the northern side is delineated by the beginning of a gentle slope occurring about six miles south of the 22nd base line. The eastern border of the basin parallels the Utikuma River and includes Randall Lake before wandering southward to meet the hills on the north shores of Lesser Slave Lake. The watershed falls roughly within $115^{\circ} - 116^{\circ}$ W and $55^{\circ} 38' - 56^{\circ} 10' N$.

Soil in the area is a grey wooded type with peat bogs and sporadic rock outcroppings present. Much of the vegetation consists of muskeg; black spruce is predominant, occurring with occasional clumps of poplar.

The climate of the area is sub-arctic, with a mean annual growing season of 150 days. Average annual snowfall is 25 inches and there is a measurable snow cover for about 150 days each year. Mean annual precipitation is listed as 17 inches and the prevailing summer winds are from the

west-northwest.*

Atikameg is the only registered settlement in the area, and the bulk of the native population is located within the Gift Lake Metis colony and the Utikuma Lake Indian Reserve.. Utikuma and Utikumasis Lakes have been fished as a "single lake" since 1942 and the catch statistics from both lakes were combined until 1966. For this reason, and because the lakes will probably be managed as a single unit in the future, the results of the Utikuma and Utikumasis surveys are presented in one report.

* Atlas of Canada 1957. Department of Mines and Technical Surveys, Geographical Branch, Ottawa, Canada.



Figure 1. Map showing the waters of the Utikuma Lake region.
Scale: one inch = four miles.

UTIKUMA LAKE

Introduction

Utikuma Lake (Townships 78-80, Ranges 8-11, West of the fifth Meridian) is located 16 miles north of Lesser Slave Lake, at an altitude of 2,115 feet above m.s.l. The lake is readily accessible and men and equipment travelled in by truck for the survey.

Utikuma Lake was commercially fished every year from 1942 to 1948. The lake winter-killed in 1948 and commercial fishing was discontinued until 1960. This kill was the result of an unfortunate combination of prolonged summer drought followed by extreme winter conditions. Since 1960 the lake has been commercially fished every year. Catches consisted primarily of pike, whitefish, and cisco, with lesser amounts of walleye and other species (Table VIII).

Morphometry

The area of Utikuma Lake, as determined by planimetry from a 1:126,000 map, is 106.4 square miles (68,096 acres). The length of the shoreline (including the islands) is 80.7 miles, resulting in a shoreline development factor of 2.2. This value indicates that the lake has a moderately irregular shoreline (Table I).

Due to its large size, accurate transect lines could not be run on Utikuma without elaborate navigational gear. Consequently, no transect soundings were made and a contour map could not be constructed. As an alternative, the depth sounder was run continually and the depths were noted. Using this method, a mean depth of nine feet was estimated by the survey crew. The maximum depth encountered was eighteen feet. With the posutulated mean depth, an approximate volume of about 612,865 acre feet was calculated.

The lake is quite shallow and is obviously in a state of advanced eutrophication.

The maximum length of the lake is 17 miles and the maximum width is 12 miles. Despite the presence of two large islands, the wind action on the lake appears to be sufficient to cause complete mixing.

The shoreline is described as level, and the vegetation at the lake edge is largely aspen, which varies in height from 20 to 100 feet. The shoreline is of a uniform consistency, being of mud mixed with lesser amounts of clay. No sand or gravel beaches were seen, although patches were encountered in the bottom samples. Aquatic vegetation is widespread, with a dense growth occurring in most of the bays. The vegetation is mostly submergent; however, beds of emergents are also common and may cover a considerable area (about 20 square miles).

Water Chemistry

Two samples were taken at each of the four limnology stations (Figure 4); one at the top and one at the bottom in each case. Dissolved oxygen was determined with a Hach kit, the total dissolved solids concentration was determined with a conductivity meter and the pH was measured with a Hellige comparator. Depths encountered varied from ten to 16 feet and the bottom type consisted of brown muck at all four stations. Thermal stratification did not occur and the oxygen readings were from 7 to 8 p.p.m. (Table II). The total dissolved solids concentration was approximately 300 p.p.m. for all stations while the pH varied from 7.8 to 8.2. The transparency rating ranged from 3.5 to 4 feet.

Plankton

A total of four vertical hauls were taken, one at each limnology station, using a Wisconsin-type plankton net (mouth diameter of 20 cm.). The most abundant phytoplankter was the green alga Pediastrum, which occurred in large numbers in all of the hauls. Ceratium, a dinoflagellate, was the second most numerous species, followed by the diatom Fragilaria. Many other species were quite common, including Nostoc, Microcystis (Cyanophyta), Hyalotheca (Chlorophyta) and Asterionella (Chrysophyta). Species present in trace amounts were Staurastrum (Chlorophyta), Glocotrichia (Cyanophyta), Stephanodiscus and Navicula (Chrysophyta).

Zooplankters in all hauls consisted of cladocerans, copepods, and rotifers. Cladocerans were the most abundant, and outnumbered the copepods by about two to one. Rotifers occurred only in trace amounts, although several species were noted.

Bottom Fauna

Thirty one bottom samples were taken, each from a separate location (Figure 3). Dredgings were washed through a screen bottom bucket (25 meshes per inch) and all living materials were preserved for further examination in the laboratory.

The dredgings revealed that most of the substrate consists of brown mud, although in a few instances sand or gravel was encountered. This lake is very rich. The standing crop of bottom fauna was calculated as 3,741 organisms per square meter, with a displacement volume of 89.03 mls. Of the organisms collected, chironomids were the dominant group, having the greatest volume of displacement and far outnumbering all other groups combined (Table III).

Fish Fauna

Two overnight net sets were made on Utikuma Lake during the survey; the lengths and mesh sizes employed are shown in Table IV. Fish taken included cisco (Coregonus artedii), lake whitefish (Coregonus clupeaformis), northern pike (Esox lucius), yellow perch (Perca flavescens), and burbot (Lota lota). Cisco were the most numerous species in the catch, while perch were the second most abundant, followed by whitefish. Only ten northern pike and four burbot were taken.

Cisco

Of the 283 fish caught, 105 were examined, and lengths, weights, and sexual maturity were recorded. In addition, scale samples were obtained for age determination. These fish were of a good size, (Table VI, Figure 6), and should be of some commercial value, as none of the fish sampled contained cysts of Triaenophorus crassus. These ciscoes appear to be maturing between three and four years of age.

Lake whitefish

Fifty one lake whitefish were caught. All of these were examined and 30 specimens were checked for cysts of Triaenophorus crassus, with negative results (Table V and Table IX). Most of these fish mature at an age of four years.

Yellow perch

Although 213 perch were caught, none were sampled. Conditions in the lake appeared excellent for perch and several "angling-size" specimens were taken from the nets.

Northern pike

Ten northern pike were caught and examined. The results are given in Table VII.

Discussion and Conclusion

By applying Ryder's index, a production figure of 33.3 pounds/acre/year was postulated, giving Utikuma Lake a total annual yield of 2,269,640 pounds of all fish species present. Although this estimate may seem optimistic it is by no means impossible, as the bottom fauna samples suggest that sufficient food is available to support such a population. I believe that total annual fish production is between 1.7 million and 2 million pounds per year. Of this annual yield, ciscoes and whitefish together represent about one million pounds.

The lake has little to offer the sports fisherman. The pike population is small and no individuals of trophy size were encountered. Perch are present in large numbers, however "angling-size" fish are too few to be of any consequence.

Utikuma presently is supporting a large commercial fishery and future management programs should be orientated accordingly.

TABLE I. Morphometry of Utikuma Lake. Data obtained from maps at a scale of 1 inch to 2 miles.

LOCATION: Tp. 78-80, R8-11, W5th

AREA: (total water surface only) 106.4 square miles, (680% acres)

VOLUME: (based on mean depth) 612864 acre feet

LENGTH OF SHORELINE: (including islands) 80.7 miles

SHORELINE DEVELOPMENT FACTOR: 2.2

MEAN DEPTH: 9 feet (approximation)*

MAXIMUM DEPTH: 18 feet

MAXIMUM LENGTH: 17 miles

MAXIMUM EFFECTIVE LENGTH: 17 miles

MAXIMUM WIDTH: 12 miles

MAXIMUM EFFECTIVE WIDTH: 10 miles

MEAN WIDTH: 6.26

(* Due to its large size, no sounding transects could be accurately run on Utikuma Lake. Mean depth is an estimate, based on a series of continual soundings.)

TABLE II. Water chemistry, Utikuma Lake. Two samples were taken at each limnology station.

Sample Number	station 6801C	station 6801L	station 68012	station 68013
Date	1	2	3	4
Depth (feet)	16-VIII-68	16-VIII-68	18-VIII-68	18-VIII-68
Temperature (°C)	surface	10	surface	16
Dissolved oxygen (ppm)	15	14.75	15	15
Phenolphthalein alkalinity (ppm CaCO ₃)	7	8	7	8
Total alkalinity (ppm CaCO ₃)	nil	nil	nil	nil
Calcium hardness (ppm CaCO ₃)	140	135	140	140
Total hardness (ppm CaCO ₃)	120	120	125	125
Chlorides (ppm)	180	180	180	180
pH	7.5	7.5	7.5	7.5
Conductivity (mmhos/cm. @ 18°C)	8.2	8.2	7.9	8.0
	343	343	344	345
			339	340
			349	354
			7.8	7.9
			140	140
			125	125
			180	180
			7.5	7.5
			8.0	8.0
			14.25	14.25
			17	17
			surface	surface
			18-VIII-68	18-VIII-68
			18-VIII-68	18-VIII-68
			14.25	14.25
			7	7
			8	8
			nil	nil
			140	140
			120	120
			180	180
			7.5	7.5
			8.2	8.2
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			339	340
			349	354
			7.8	7.9
			140	140

TABLE III. Bottom fauna analysis, Utikuma Lake. $31 \times \frac{1}{4}$ sq. ft. dredgings were taken.

Organisms	No./m ²	% Total No.	Volume/m ² (mls)	% Total Volume
Chironomidae	2662	71.1	83.12	93.4
Amphipoda	816	21.8	2.09	2.3
Gastropoda	70	1.9	1.18	1.3
Oligochaeta	75	2.0	.14	.2
Pelecypoda	29	0.8	*	-
Hirudinea	36	1.0	2.36	2.6
Acarina	42	1.1	.14	.2
Others	11	0.3	*	-
TOTALS	3741	-	89.03	-

* Volumes insufficient for measurement.

TABLE IV. Catch Records Summarized for Utikuma Lake.

Date	Set No.	Mesh in Length (yds)	Depth (ft.)	Lake Whitefish	Cisco	Northern Pike	Perch	Others	Total
16-VIII-68	1	2½ x 100	10	-	12	7	207	-	226
16-VIII-68	1	3½ x 100	10	-	14	3	4	-	21
16-VIII-68	1	4½ x 100	10	5	8	-	-	-	13
16-VIII-68	1	5½ x 100	10	3	5	-	-	-	8
18-VIII-68	2	3½ x 100	18	-	105	-	2	1	108
18-VIII-68	2	4½ x 100	18	14	114	-	-	3	131
18-VIII-68	2	5½ x 100	18	22	25	-	-	-	47

TABLE V. Lake whitefish from Utikuma Lake, August, 1968. Sample size 51.

Age Class	% of Sample	\bar{x} fork length (range) mm.	\bar{x} weight (range) gms.	% Female
IV	16	427 (409-447)	1236 (780-1460)	38
V	80	438 (410-471)	1367 (1075-1740)	46
VI	4	456 (456-457)	1505 (1465-1545)	50

TABLE VI. Ciscoes from Utikuma Lake, August, 1968. Sample size 105.

Age Class	% of Sample	\bar{x} fork length (range) mm.	\bar{x} weight (range) gms.	% Female
II	2	236 (230-242)	165	50
III	4	343 (329-359)	765 (700-840)	0
IV	74	377 (340-412)	960 (730-1230)	38
V	20	389 (356-416)	1036 (830-1270)	67

TABLE VII. Northern pike from Utikuma Lake, August, 1968. Sample size 16.

Age Class	% of Sample	\bar{x} fork length (range) mm.	\bar{x} weight (range) gms.	% Female
III	6	468	820	0
IV	13	540 (490-590)	1095 (860-1330)	50
V	75	544 (504-588)	1126 (930-1280)	58
VI	6	560	1240	100

TABLE VIII.

Commercial Fishing Records, (all weights in pounds)
UTIKUMA & UTIKUMASIS LAKES

<u>Year</u>	<u>Lic.</u>	<u>Mixed</u>	<u>Cisco</u>	<u>Porch</u>	<u>Walleye</u>	<u>Pike</u>	<u>Whitefish</u>	<u>Total</u>
42/43	62		7,276		86	39,466	93,413	140,241
43/44	51					39,268	100,147	139,415
44/45	64		20,208		11	11,378	166,779	198,376
45/46	76		13,281		120	22,288	105,606	146,295
46/47	42		52,651		798	4,037	113,069	170,555
47/48	41		279		8	82	2,715	3,084
60/61	41		2,407			1,291	9,119	12,817
61/62	15		382	03	139	32,689	34,866	68,079
62/63	28	2,999	3,922	11	23	487,692	11,381	506,028
63/64	51	840	27,229	7	239	506,640	35,107	570,062
64/65	93	906	71,691			128,979	78,985	280,561
65/66	125	713	18,504	6,059		366,491	92,372	484,139
66/67	156	28,100(1.)	73,691	89,995		452,672	199,546	844,004
67/68	182	10,000(1.)	167,290	23,289		198,593	172,439	571,611

TABIE IX. Rates of infestation of Triaenophorus crassus in lake whitefish from Utikuma Lake.

Date	No. of Fish	No. Infested	Weight in Pounds	No. of Cysts	R.O.I. (cysts/100lbs.)
1-XII-44	200	12	693.8	33	4.8
4-XI-45	200	38	389.6	119	13.4
12-I-48	99	62	578.8	867	149.8
29-X-52	14	0	48.43	0	0
9-IX-60	58	1	95.38	3	3.15
19-VIII-68	30	0	90.31	0	0

UTIKUMA LAKE

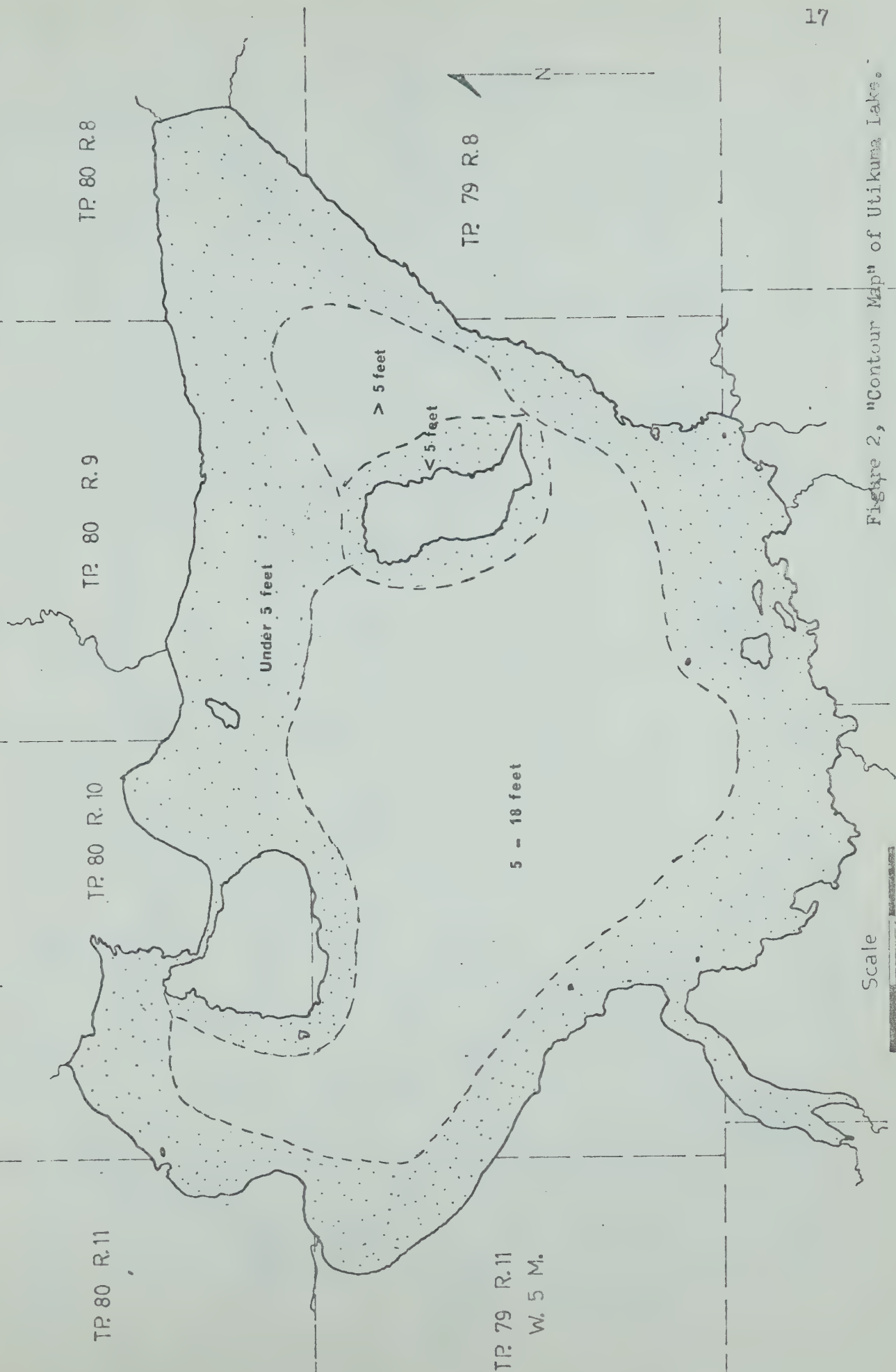


Figure 2, "Contour Map" of Utikuma Lake.

Approximate Depth Distribution

UTIKUMA LAKE

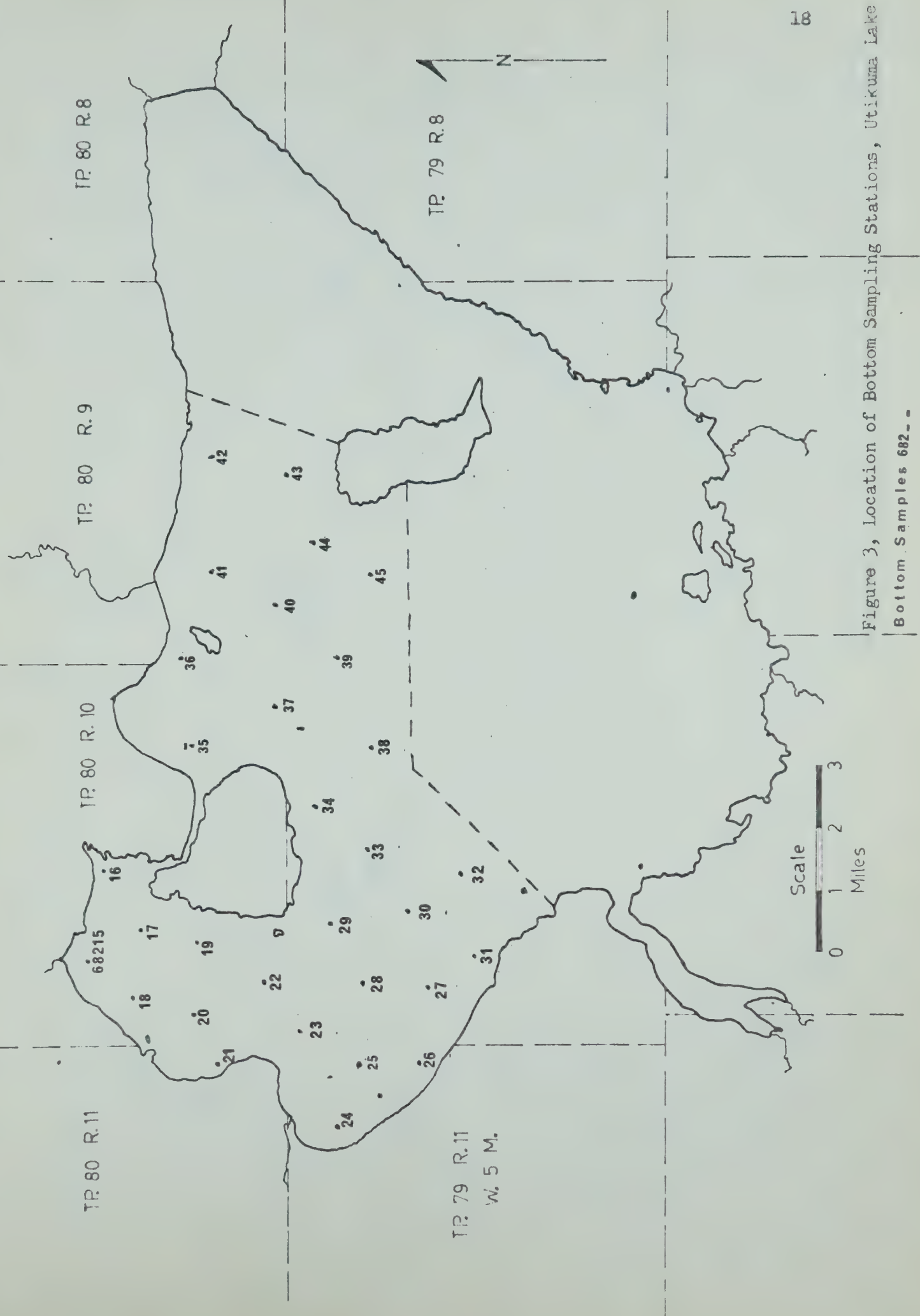


Figure 3, Location of Bottom Sampling Stations, Utikuma Lake
Bottom Samples 682..

UTIKUMA LAKE

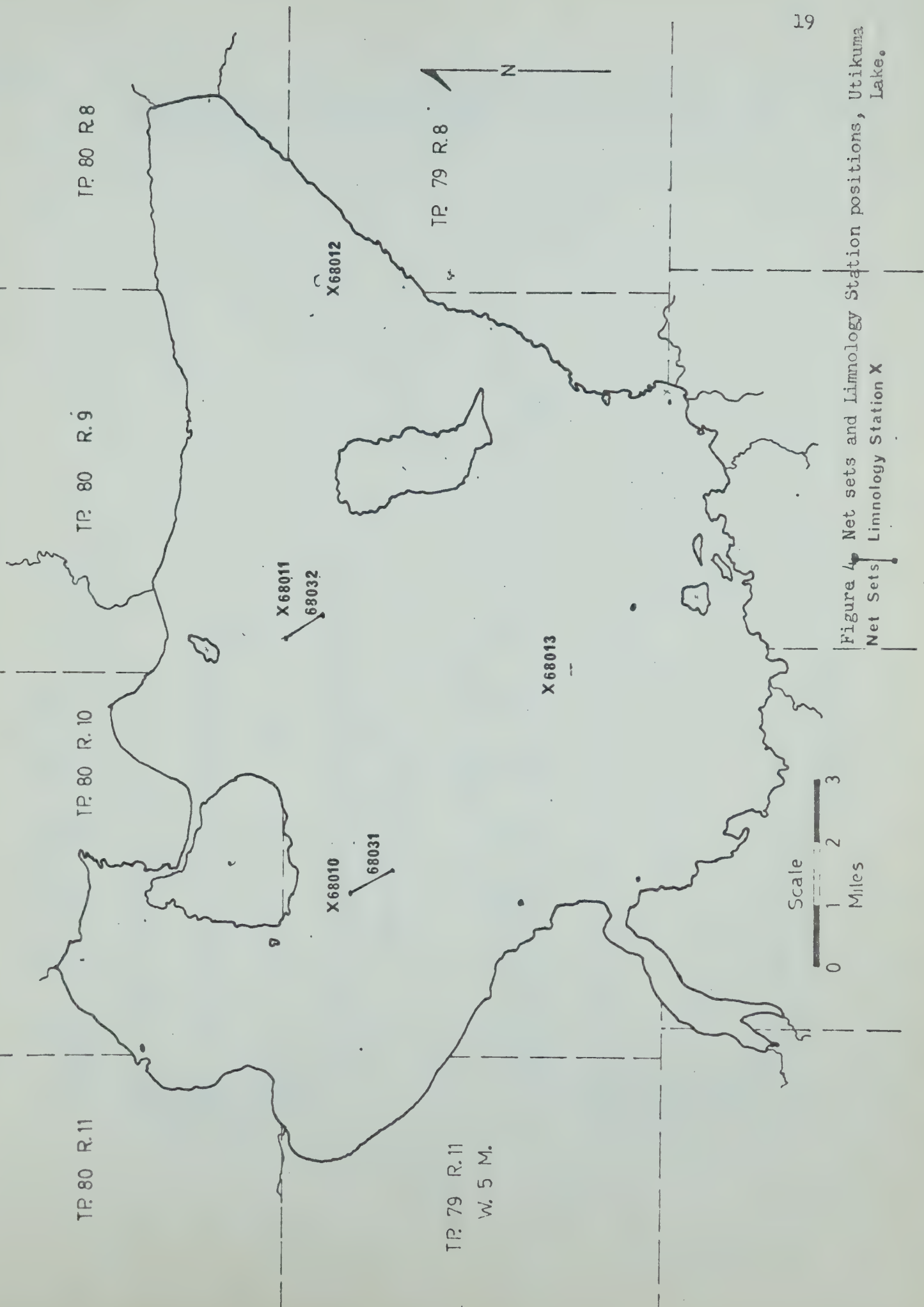


Figure 4. Net sets and Limnology Station positions, Utikuma Lake.

Figure 5.

Growth rate of lake whitefish, Utikuma Lake. The figures show the ranges and means of fork lengths and weights of each age class. Sample sizes are indicated.

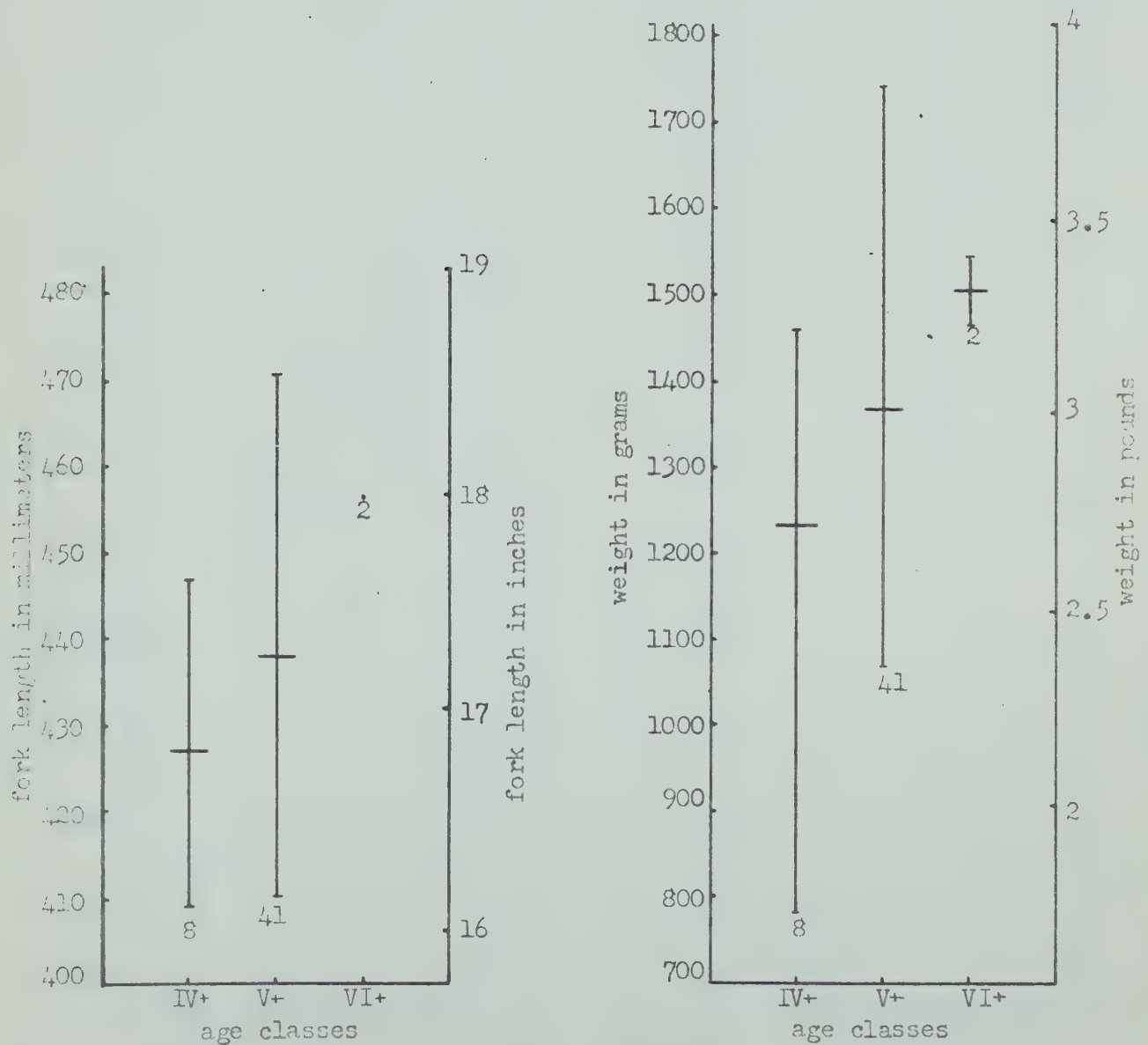
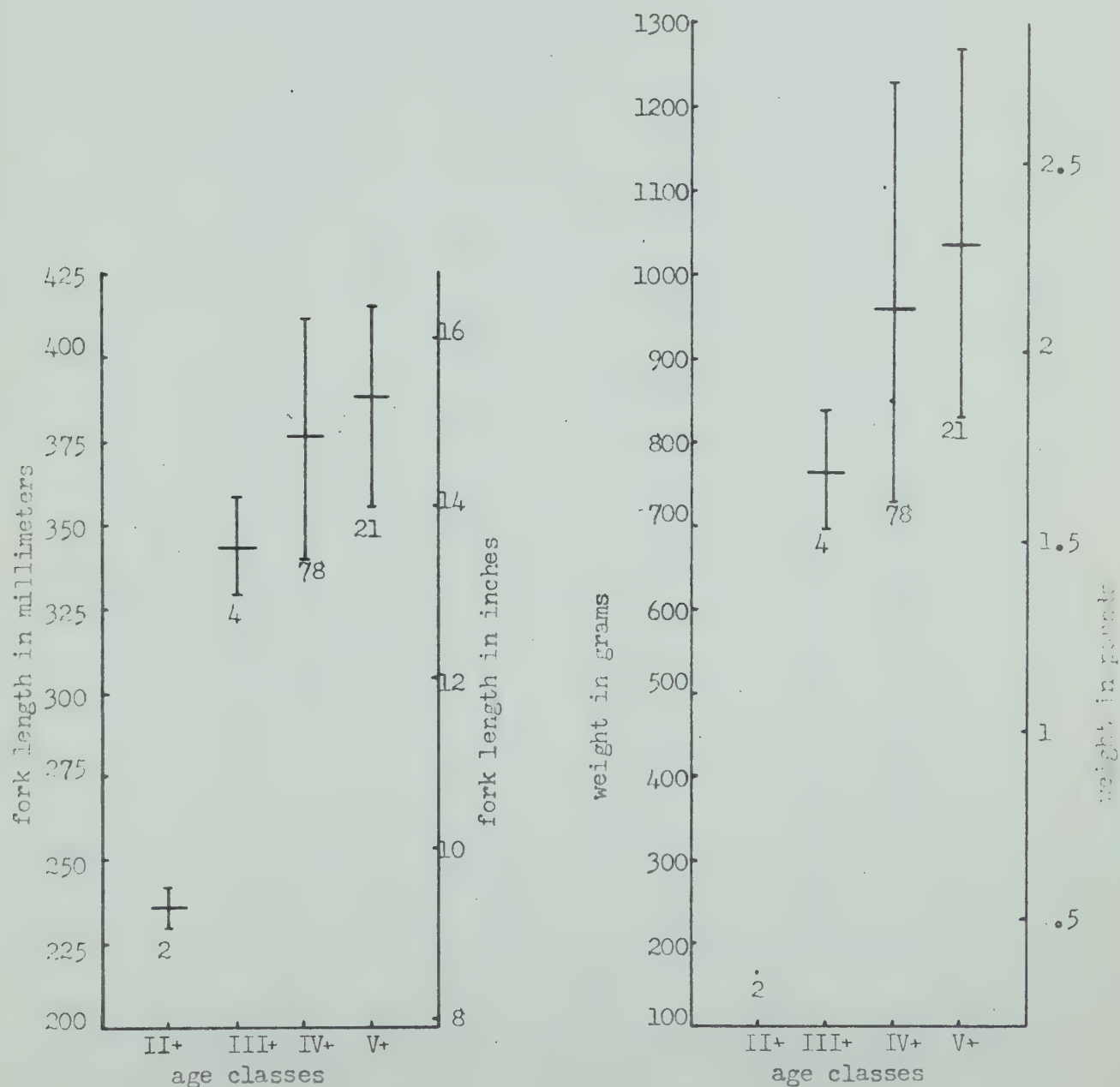


Figure 6. Growth rate of tullibee, Utikuma Lake. The figures show the ranges and means of fork lengths and weights of each age class. Sample sizes are indicated.



UTIKUMASIS LAKE

Introduction

Utikumasis or Little Whitefish Lake (Townships 79-80, Range 11, West of the fifth Meridian) is situated about four miles west of Utikuma Lake and lies at an approximate altitude of 2,125 feet above m.s.l. Utikumasis Lake drains into Utikuma Lake via the Utikuma River.

Records indicate that Utikumasis Lake has been commercially fished since 1942. As with Utikuma, there was a closed period from 1948 to 1960. Since 1960 however, Utikumasis Lake has been fished commercially every year. With the exception of 1966, the yearly catch records have been combined with those from Utikuma Lake and presented as an aggregate total for the two lakes (Table VIII, Utikuma Report). During the 1966 season, 21,950 pounds of whitefish, 1,700 pounds of pike and 1,000 pounds of cisco were harvested.

Road access to the lake is usually good, but can deteriorate rapidly with poor weather conditions. Utikumasis Lake was surveyed from August 22 to August 25, 1968, to assess its fisheries potential.

Morphometry

Utikumasis Lake was calculated to be some 4.65 square miles (2,982 ac.) in surface area and the shoreline length was measured as 11.5 miles. The shoreline development factor is 1.5, indicating that the lake has a fairly regular shoreline. The maximum effective length of the lake is 3.10 miles in a west-southwest direction. Although this direction does not correspond to that of the prevailing summer winds, the lake seems to be sufficiently exposed to allow complete mixing of the waters.

Depths were determined using an echo sounder and a contour map (Figure 8) was drawn from the data. The volume was calculated to be about 46,882 acre feet, giving a mean depth of 16 feet. The maximum depth encountered was thirty-three feet.

The shoreline consists largely of areas of soil and sand, with the occasional patch of rubble present. The surrounding topography is described as the "rolling hill type" and the dominant vegetation is black poplar and spruce, with willows common along the shoreline. Aquatic vegetation, both emergent and submergent, is plentiful and extends for several hundred yards off-shore in some distances. At the time of the survey a dense algal bloom of Aphanizomenon flos-aquae was in progress.

Only two permanent inflowing streams were noted, these being Mink Creek and the Utikuma River. Both waterways were sites of a considerable amount of beaver activity and usually have a sluggish flow rate throughout the summer months.

Water Chemistry

Two samples were taken at the limnology station, one at the surface and one at a depth of 30 feet. Dissolved oxygen was measured with a Hach kit, total dissolved solids concentration was determined using a conductivity meter, and pH was determined using a Hellige pocket comparator. The bottom was at a depth of 30 feet and consisted of black mud. A thermocline was not encountered; however, the surface and bottom oxygen readings differed markedly (Table II). The pH was 8.8 both at the surface and on the bottom. Total dissolved solids concentration was approximately 200 p.p.m. at the surface and 220 p.p.m. at the bottom. The transparency rating was 1.5 feet.

Plankton

A single vertical plankton haul (30 feet) was taken at the limnology station, using a Wisconsin type plankton net with a mouth diameter of 20 cms. The sample was taken during a bloom of Aphanizomenon flos-aquae (Cyanophyta) and this phytoplankter was so abundant that other species, if present, could not be detected.

The smaller specimens of zooplankton were observed but attempts to strain them from the samples met with no success. Copepods and cladocerans could be barely distinguished; a relative abundance count, however, showed that cladocerans were very common, outnumbering copepods by about seven to one.

Bottom Fauna

Eighteen bottom samples were taken using a six-inch-square Ekman dredge. The samples were washed through a screen bottom bucket (25 meshes per inch) and all living organisms were preserved for further analysis.

Most of the samples showed the lake bottom to be of brown-black mud; however, the occasional sandy area was encountered. The standing crop of bottom fauna was calculated to be 8,064 organisms per square meter, with a volume displacement of 85.38 cc. per square meter. As in Utikuma Lake, the chironomids were predominant in numbers and displacement volume. Also present in large numbers were amphipods, oligochaetes, and Chaoborus sp. (Table III).

Fish Fauna

Three overnight sets were made in Utikumasis Lake (Figure 10)

and the catch consisted of northern pike, walleye, lake whitefish, ciscoes, white sucker and burbot (Table IV). Ciscoes comprised the bulk of the catch (201 specimens), far outnumbering all of the other species combined.

Cisco

Of the 201 fish caught, 94 were examined, (Table VI, Figure 11), lengths, weights, and sexual maturity were recorded and scale samples were taken for age determination. Thirty-four fish were examined for cysts, with negative results. Although these fish are not as large as those from Utikuma Lake, they should have a comparable market value.

Whitefish

Twenty-two whitefish were caught, sampled, and examined for cysts. These fish are somewhat smaller than those from Utikuma Lake (Table V, Figure 11). However, they too were completely free of Triaenophorus infestation. Most of these fish are attaining sexual maturity at four years.

Pike

Nine pike were taken during the survey and the range of their lengths and weights are shown in Table VII. Although pike of trophy size apparently have been taken by anglers none were observed during the survey.

Walleye

The walleye population appeared to be confined to the northwest corner of the lake. Walleye were reported as being fairly numerous in this area, although only two specimens were captured in a 300 yard net set.

Discussion and Conclusion

If the Ryder index is applied to Utikumasis Lake, a production figure of 12.25 pounds per acre per year can be calculated. This would give the lake a total annual production of 36,530 pounds of fish of all types. Of this, roughly 9,700 pounds would be of whitefish, 15,300 pounds of ciscoes, 7,100 pounds of suckers and other forage fish, and 4,200 pounds of piscivorous fish.

Cisco from Utikuma and Utikumasis Lakes are of good market value because of their large size and lack of Triaenophorus cysts.

The whitefish population at Utikuma and Utikumasis is probably larger than was indicated by the survey test nettings. Both lakes feature a very rich bottom fauna. This could reduce the "grazing" movements of the whitefish, resulting in fewer fish being netted.

Trophy-size pike have been reported taken from Utikumasis Lake, and a small population of walleye are known to occur there. However, the sports fishery values are not significant when compared with the values of the commercial harvest and this fact should be considered in the development of future management program.

TABLE I. Morphometry of Utikumasis Lake.

LOCATION: Tp. 79-80, R. 11, W. 5
 AREA: 4.65 square miles (2,982 acres)
 VOLUME: 46,882 acre feet
 LENGTH OF SHORELINE: 11.5 miles
 SHORELINE DEVELOPMENT FACTOR: 1.5
 MEAN DEPTH: 16 feet
 MAXIMUM DEPTH: 33 feet
 MAXIMUM LENGTH: 3.10 miles
 MAXIMUM EFFECTIVE LENGTH: 3.10 miles
 MAXIMUM WIDTH: 2.55 miles
 MAXIMUM EFFECTIVE WIDTH: 2.15 miles
 MEAN WIDTH: 1.50 miles

DEPTH DISTRIBUTION:

	Area	% Surface Area
Surface Area	4.65 sq. mi. (2,982 ac.)	100
10 feet plus	1736 acres	58
20 feet plus	1013 acres	37
30 feet plus	832 acres	28

TABLE II. Water chemistry, Utikumasis Lake. Two samples were taken at limnology station 68014.

Sample Number	1	2
Date	24-VIII-68	24-VIII-68
Depth (feet)	surface	30
Temperature	16.75	15
Dissolved oxygen (ppm.)	12	4
Phenolphthalein alkalinity (ppm. CaCO_3)	nil	nil
Total alkalinity (ppm. CaCO_3)	90	110
Calcium hardness (ppm. CaCO_3)	100	120
Total hardness (ppm. CaCO_3)	120	120
Chlorides (ppm.)	10	12.5
pH	8.8+	8.8+
Conductivity (mmhos/cm. @ 18°C)	221	231

TABLE III. Bottom fauna analysis, Utikumasis Lake. 18 x 0.25 square-foot dredgings were taken.

Organisms	No./m ²	% Total No.	Volume/m ² (mls)	% Total Volume
Chironomidae	4868	60.4	52.38	61.3
Chaeoborinae	751	9.3	7.18	8.4
Amphipoda	1182	14.7	2.87	3.4
Pelecypoda	79	1.0	10.76	12.6
Hirudinea	84	1.0	.72	.8
Gastropoda	38	.5	1.91	2.2
Acarina	31	.4	*	*
Oligochaeta	995	12.3	4.78	5.6
Trichoptera	22	.3	4.78	5.6
Other	14	.2	*	*
TOTALS	8064		85.38	

* Volumes insufficient for measurement.

TABLE IV. Catch Records Summarized for Utihumasis Lake.

Date	Set No.	Mesh x Length	Depth (ft.)	Lake Whitefish	Cisco	Northern Pike	Walleye	White Sucker	Burbot	Total
25-VIII-68	1	2½ x 100	30-0	1	36	5	-	-	-	42
25-VIII-68	1	3½ x 100	0-30	4	49	1	-	-	1	55
25-VIII-68	2	4½ x 100	30	1	8	-	-	-	-	9
25-VIII-68	2	5½ x 100	30	0	-	-	-	-	-	1
26-VIII-68	3	3½ x 100	22	1	51	3	1	3	-	59
26-VIII-68	3	4½ x 100	23	4	44	-	1	5	1	55
26-VIII-68	3	5½ x 100	25	11	3	-	-	-	-	14

TABLE V. Lake whitefish from Utikumasis Lake, August, 1968. Sample size 22.

Age Class	% of Sample	\bar{x} fork length (range) mm.	\bar{x} weight (range) gms.	% Female
IV	41	419 (402-428)	1087 (970-1240)	22
V	59	434 (399-477)	1306 (930-1710)	62

TABLE VI. Cisco from Utikumasis Lake, August, 1968. Sample size 94.

Age Class	% of Sample	\bar{x} fork length (range) mm.	\bar{x} weight (range) gms.	% Female
IV	82	360 (326-457)	708 (560-995)	56
V	18	368 (342-391)	747 (615-855)	65

TABLE VII. Northern pike from Utikumasis Lake, August, 1968. Sample size 9.

Age Class	% of Sample	\bar{x} fork length (range) mm.	\bar{x} weight (range) gms.	% Female
III	22	508 (499-516)	828 (795-860)	0
IV	56	550 (501-620)	978 (840-1365)	0
V	22	602 (593-611)	1345 (1200-1490)	50

TP.80 R.11 W.5.

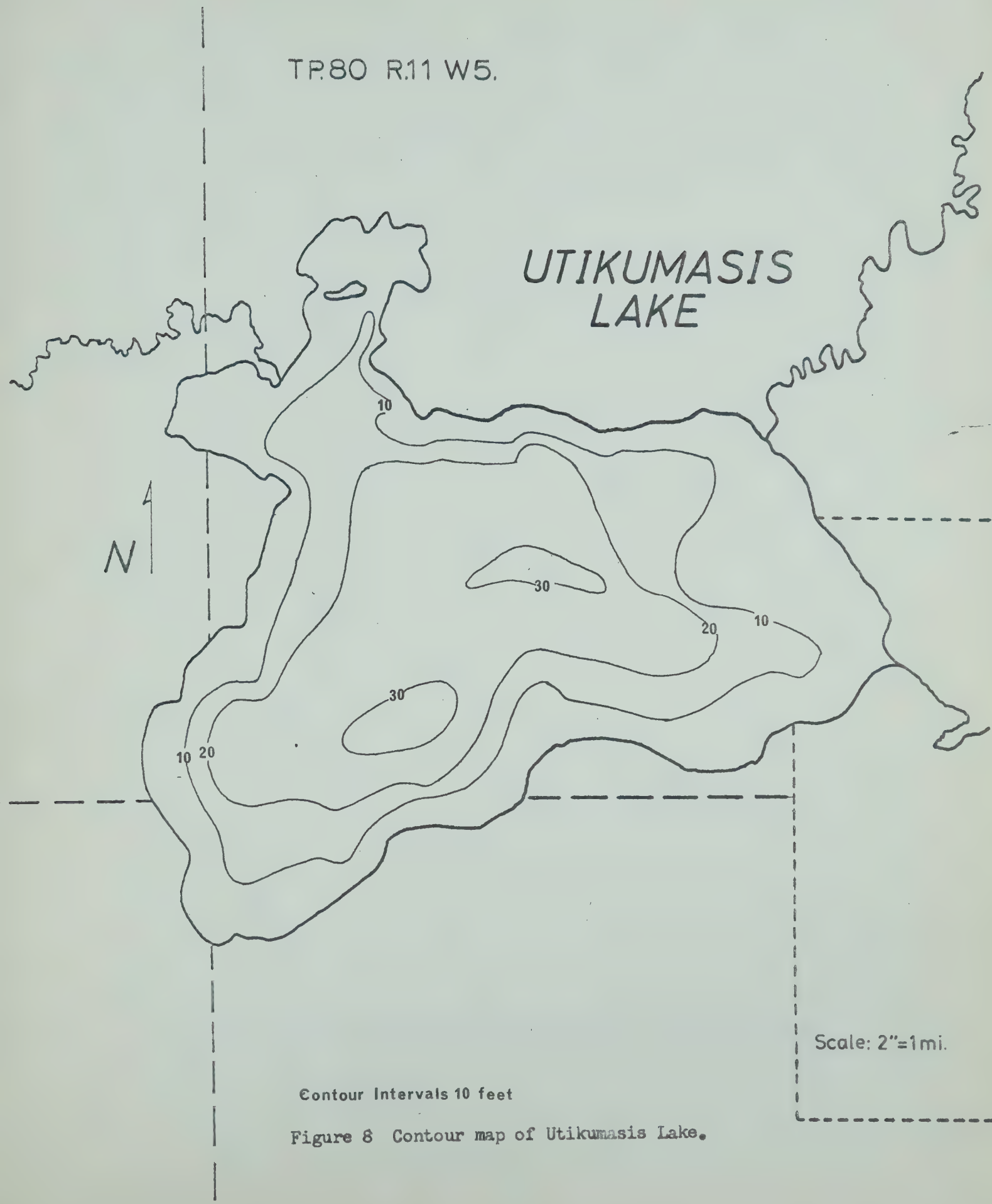
UTIKUMASIS
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Scale: 2"=1mi.

Contour Intervals 10 feet

Figure 8 Contour map of Utikumasis Lake.



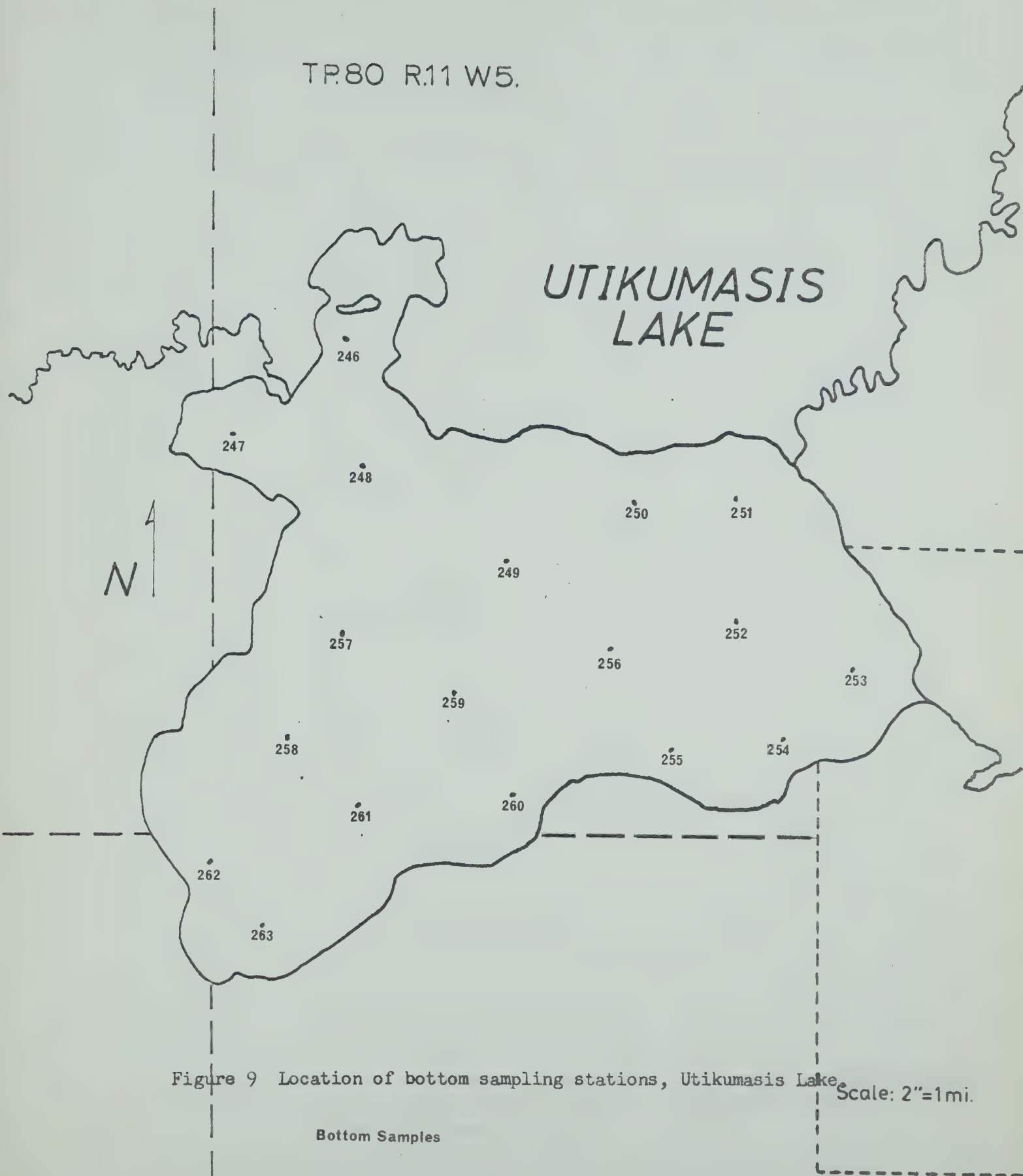


Figure 9 Location of bottom sampling stations, Utikumasis Lake

TP.80 R.11 W.5.

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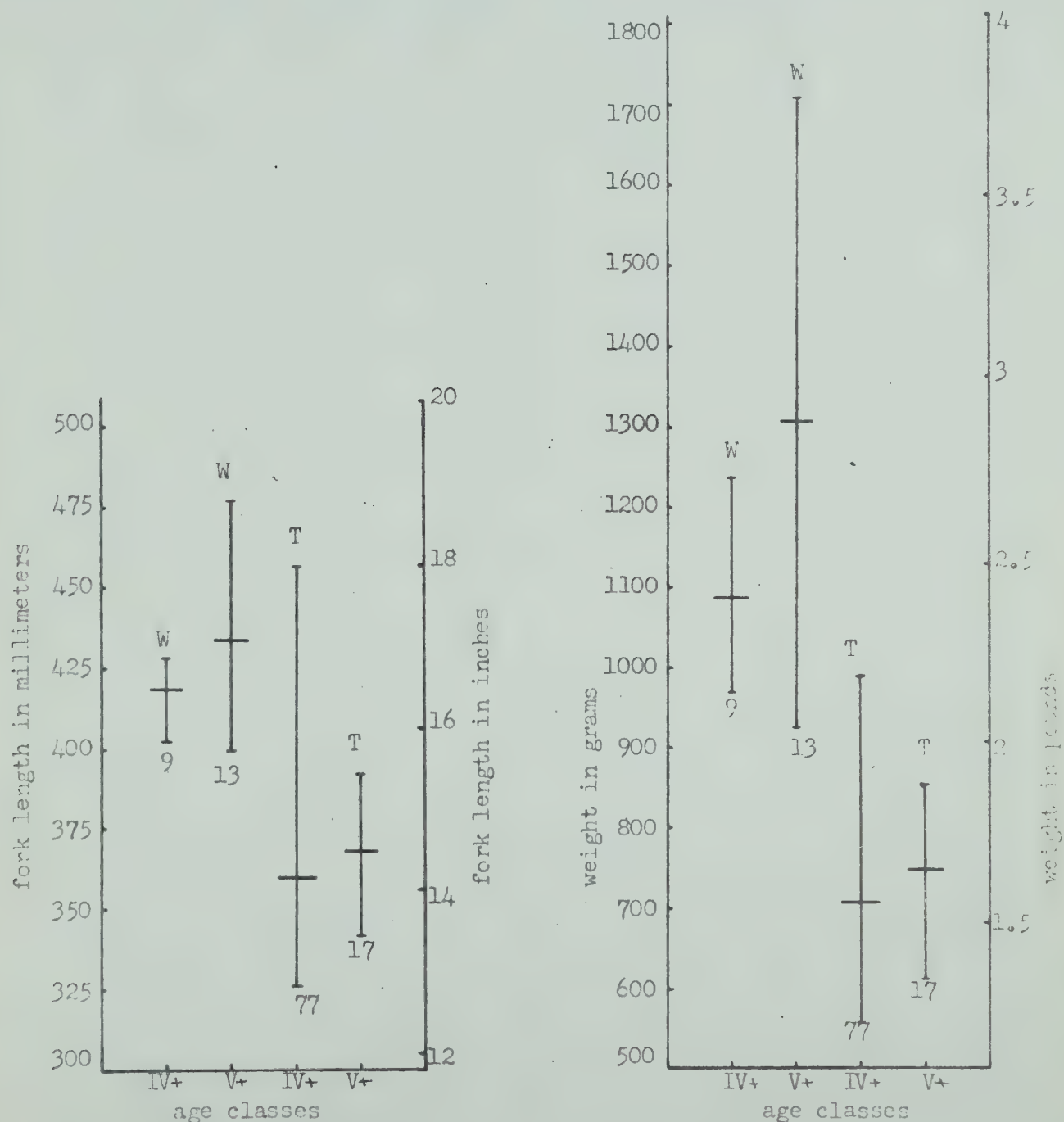
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Scale: 2"=1mi.

Net Sets & Limnology Station X

Figure 10 Net sets and limnology station positions, Utikumasis
Lake.

Figure 11. Growth rate of lake whitefish and ciscoes, Utikumasias Lake. The figures show the ranges and means of fork lengths and weights of each age class. Sample sizes are indicated.



W - lake whitefish

T - cisco

ACKNOWLEDGEMENTS

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